



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,277	10/09/2001	Ann Witvrouw	00-1092-A	5789
20306	7590	11/04/2003	EXAMINER	
MCDONNELL BOEHNEN HULBERT & BERGHOFF 300 SOUTH WACKER DRIVE SUITE 3200 CHICAGO, IL 60606			PERKINS, PAMELA E	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 11/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/973,277

Applicant(s)

WITVROUW ET AL.

Examiner

Pamela E Perkins

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This office action is in response to the filing of the amendment on 11 August 2003. Claims 1-22 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuke (EP 658927).

Kuke discloses a method of producing micromachined devices where at least one micromachined device is processed from a crystalline silicon wafer (1), with a front plane and a back plane, wherein the micromachined device comprises at least one elongated opening (3). Kuke further discloses the opening (3) having a longitudinal axis, so that an angle is formed by the longitudinal axis and a line formed by an intersection of the front plane of the wafer (1) and a cleavage plane, a plane along which cleavage of the wafer (1) is most likely to occur (abstract; Fig. 1). Kuke also discloses the wafer (1) as a circular disc with at least one part off along a chord of the wafer being flat (4) to the wafer, wherein the flat (4) may be parallel to the intersection. Kuke discloses the front and back planes of the wafer having an orientation in the {100}

family and the cleavage plane having an orientation in the {110} or {111} family (description).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuke in view of Imaizumi et al. (4,278,987).

Kuke discloses a method of producing micromachined devices where at least one micromachined device is processed from a crystalline silicon wafer (1), with a front plane and a back plane, wherein the micromachined device comprises at least one elongated opening (3). Kuke further discloses the opening (3) having a longitudinal axis, so that an angle is formed by the longitudinal axis and a line formed by an intersection of the front plane of the wafer (1) and a cleavage plane, a plane along which cleavage of the wafer (1) is most likely to occur (abstract; Fig. 1). Kuke also discloses the wafer (1) as a circular disc with at least one part off along a chord of the wafer being flat (4) to the wafer, wherein the flat (4) may be parallel to the intersection. Kuke discloses the front and back planes of the wafer having an orientation in the {100} family and the cleavage plane having an orientation in the {110} or {111} family (description). Kuke does not disclose the angle as less than 45°.

Imaizumi et al. disclose a method of producing micromachined devices where an opening is formed in a silicon wafer, wherein the opening has an orientation in the {110} or {111} family and the wafer having an orientation in the {100} family. Imaizumi et al. further disclose forming the opening at angle of less than 45° to the wafer (Fig. 6; col. 4, lines 3-32; col. 9, lines 36-44).

Since Kuke and Imaizumi et al. are both from the same field of endeavor, a method of producing micromachined devices, the purpose disclosed by Imaizumi et al. would have been recognized in the pertinent art of Kuke. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify Kuke by having the angle as less than 45° as taught by Imaizumi et al. so the opening suitable for a high voltage device (col. 4, lines 3-15).

Claims 9, 12, 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuke in view of Izuha et al. (6,440,616).

Kuke discloses a method of producing micromachined devices where at least one micromachined device is processed from a crystalline silicon wafer (1), with a front plane and a back plane, wherein the micromachined device comprises at least one elongated opening (3). Kuke further discloses the opening (3) having a longitudinal axis, so that an angle is formed by the longitudinal axis and a line formed by an intersection of the front plane of the wafer (1) and a cleavage plane, a plane along which cleavage of the wafer (1) is most likely to occur (abstract; Fig. 1). Kuke also discloses the wafer (1) as a circular disc with at least one part off along a chord of the wafer being flat (4) to the wafer, wherein the flat (4) may be parallel to the intersection.

Art Unit: 2822

Kuke discloses the front and back planes of the wafer having an orientation in the {100} family and the cleavage plane having an orientation in the {110} or {111} family (description). Kuke does not disclose subjecting the wafer to a photolithography process using a rotating mask.

Izuha et al. disclose a method of producing semiconductor devices where a silicon wafer is subjected to a photolithography process to pattern the wafer through a mask, and then etching the wafer. Izuha et al. further disclose rotating the mask over the wafer (col. 4, line 36 thru col. 5, line 20).

Since Kuke and Izuha et al. are both from the same field of endeavor, a method of producing semiconductor devices, the purpose disclosed by Izuha et al. would have been recognized in the pertinent art of Kuke. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify Kuke by subjecting the wafer to a photolithography process using a rotating mask as taught by Izuha et al. to improve the precision of the photolithography process (col. 3, lines 9-24).

Claims 10, 11, 13, 14, 16, 17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuke in view of Izuha et al. as applied to claims 1-5, 7, 9, 12, 15 and 18 above, and further in view of Marinaro et al. (6,245,584).

Kuke discloses a method of producing micromachined devices where at least one micromachined device is processed from a crystalline silicon wafer (1), with a front plane and a back plane, wherein the micromachined device comprises at least one elongated opening (3). Kuke further discloses the opening (3) having a longitudinal axis, so that an angle is formed by the longitudinal axis and a line formed by an

intersection of the front plane of the wafer (1) and a cleavage plane, a plane along which cleavage of the wafer (1) is most likely to occur (abstract; Fig. 1). Kuke also discloses the wafer (1) as a circular disc with at least one part off along a chord of the wafer being flat (4) to the wafer, wherein the flat (4) may be parallel to the intersection. Kuke discloses the front and back planes of the wafer having an orientation in the {100} family and the cleavage plane having an orientation in the {110} or {111} family (description). Kuke in view of Izuha et al. do not disclose the photolithography process comprising a contact printing step, a proximity printing step or a number of projection printing steps.

Marinero et al. disclose a method of processing micromachined devices where a photolithography process is performed on a wafer. Marinero et al. further disclose the photolithography process comprising a contact printing step, a proximity printing step or a number of projection printing steps (col. 1, lines 7-65).

Since Kuke and Marinero et al. are both from the same field of endeavor, a method of producing micromachined devices, the purpose disclosed by Marinero et al. would have been recognized in the pertinent art of Kuke. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify Kuke by the photolithography process comprising a contact printing step, a proximity printing step or a number of projection printing steps as taught by Marinero et al. so to not underexpose the wafer (col. 1, lines 46-65).

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuke in view of Liu et al. (6,213,050).

Kuke discloses a method of producing micromachined devices where at least one micromachined device is processed from a crystalline silicon wafer (1), with a front plane and a back plane, wherein the micromachined device comprises at least one elongated opening (3). Kuke further discloses the opening (3) having a longitudinal axis, so that an angle is formed by the longitudinal axis and a line formed by an intersection of the front plane of the wafer (1) and a cleavage plane, a plane along which cleavage of the wafer (1) is most likely to occur (abstract; Fig. 1). Kuke also discloses the wafer (1) as a circular disc with at least one part off along a chord of the wafer being flat (4) to the wafer, wherein the flat (4) may be parallel to the intersection. Kuke discloses the front and back planes of the wafer having an orientation in the {100} family and the cleavage plane having an orientation in the {110} or {111} family (description). Kuke does not disclose using the micromachined devices in a Microelectromechanical system (MEMS).

Liu et al. disclose a method of producing micromachined devices where the micromachined devices in a MEMS (col. 1, lines 7-45).

Since Kuke and Liu et al. are both from the same field of endeavor, a method of producing micromachined devices, the purpose disclosed by Liu et al. would have been recognized in the pertinent art of Kuke. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to modify Kuke by using the micromachined devices in a MEMS as taught by Liu et al. to have a wider range of applicability (col. 1, lines 35-38).

Response to Arguments

Applicant's arguments filed 11 August 2003 have been fully considered but they are not persuasive. As stated above, Kuke discloses the method for producing micromachined devices for use in Microelectromechanical Systems (MEMS) as described in claim 1.

In response to the applicant's arguments, the applicant argues the Kuke reference is for using in a silicon motherboard. However, the intent use of the present invention is not claimed and during patent examination, the pending claims must be given their broadest reasonable interpretation, See M.P.E.P. § 2111. Applicant also argues that the present invention does not disclose the axis of the cavity as parallel with the cleavage plane. The present invention does claim that the cleavage plane is at an axis where the cleavage is most likely to occur; "most likely to occur" is a broad statement and could encompass a large range of axis'.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 2822


extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela E Perkins whose telephone number is (703) 605-4299. The examiner can normally be reached on Monday thru Friday, 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

PEP


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800